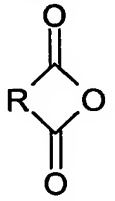
Claims

1. Process for preparing a coated metal sheet coil comprising the following steps:
(1) decoiling of the coiled metal sheet;
(2) coating the metal sheet with a curable composition comprising an (meth)acrylated oligomer which is the reaction product of a carboxyl functionalized polybutadiene comprising x equivalents of –COOH groups with (i) y equivalents of one or more (meth)acrylated monoepoxides or (ii) a mixture of z equivalents of one or more polyepoxides and at least (z – x) equivalents of an α,β-unsaturated carboxylic acid ; with $z > x$ and $y \geq x$ ;
(3) curing the composition ; and
(4) recoiling the coated metal sheet.

2. Process according to claim 1, wherein the carboxyl functionalized polybutadiene is the reaction product of a hydroxyl-terminated polybutadiene with a cyclic anhydride responding to the general formula (I) :



(I)

wherein R represents arylene, cycloalkylene, alkylene or alkenylene group, it being possible for R to bear alkyl, alkenyl groups, a –COOH group and/or another anhydride group.

3. Process according to claim 2, wherein the anhydride is phthalic anhydride or dodecenylsuccinic anhydride.

4. Process according to any of claims 1 to 3, wherein the (meth)acrylated oligomer is the reaction product of a carboxyl functionalized polybutadiene comprising x equivalents of –COOH groups with y equivalents of one or more (meth)acrylated mono-epoxides, y being equal to x.

5. Process according to any of claims 1 to 4, wherein the (meth)acrylated mono-epoxide is chosen from glycidylacrylate and glycidylmethacrylate.

6. Process according to any of claims 1 to 3, wherein the (meth)acrylated oligomer is the reaction is the reaction product of a carboxyl functionalized polybutadiene comprising x equivalents of –COOH groups with z equivalents of at least one polyepoxide and (z-x) equivalents of at least one α,β-unsaturated carboxylic acid.

7. Process according to claim 6, wherein z is greater than 2x.

8. Process according to claim 6 or 7, wherein α,β-unsaturated carboxylic acid is chosen from acrylic and methacrylic acid.

9. Process according to any of claims 1 to 3 or 6 to 8, wherein the polyepoxide is chosen from diglycidylethers of aromatic or aliphatic diols or cycloaliphatic diepoxides.

10. Process according to claim 9, wherein the polyepoxide is chosen from diglycidyl ether of bisphenol-A, diglycidylether of poly(ethylene oxide-co-propylene oxide), diglycidylether of polypropylene oxide and diglycidylether of butanediol.

11. Process according to any of claims 1 to 3 or 6 to 10, wherein the (meth)acrylated oligomer is prepared by adding the α,β unsaturated carboxylic acid to the carboxyl functionalized polybutadiene before or at the latest at the same time as the polyepoxide.

12. Process according to any of claims 1 to 11 wherein the (meth)acrylated oligomer is obtained by the reaction of the carboxyl functionalised polybutadiene and the mono- or polyepoxide in the presence of at least one non reactive diluent chosen from mono- or polyfunctional (meth)acrylate monomers.

13. Process according to claim 12, wherein the non reactive diluent is chosen from phenoxyethyl acrylate, isobornyl acrylate, n-butyl acryloyloxy ethyl carbamate and their mixtures.

14. Process according to any of claims 1 to 13, wherein the curable composition comprises :

- from 8 % to 50 % by weight of (meth)acrylated oligomer,
- from 0 to 65 % by weight of non-reactive diluent,
- from 0 to 60 % by weight of additional diluent chosen from copolymerizable ethylenically unsaturated monomers,
- from 0.01 to 60 % by weight of (meth)acrylated polyepoxide,
- from 0.01 to 5 % by weight of photoinitiator or chemical initiator, and
- from 0 to 20 % by weight of adhesion promoter.

15. Process according to any of claims 1 to 14, wherein the curing is done by electron beam or UV-radiation.